

Breaker Simulator DRTS-12

to calibrate the timing of Circuit Breaker Test Systems

The Breaker Simulator DRTS-12 is used to accurately test and calibrate Circuit Breaker Test Systems, e.g. the Doble TDR9000 and similar testers.

Principal of Operation

1 Breaker Channels

The Breaker Simulator DRTS-12 contains twelve independent breaker channels. Each channel is electrically isolated from each other and Ground. An exact timing circuit controls several electronic switches that switch different resistors between the channel contact terminals. These resistors are rated for 1% accuracy, ten times better than the rated accuracy of the TDR9000. The following switching resistance values (for R2-R5) are available:

0 Ω	360 Ω
15 Ω	1 k Ω
100 Ω	6.8 k Ω

Table 1: Output Resistance Values (R2-R5)

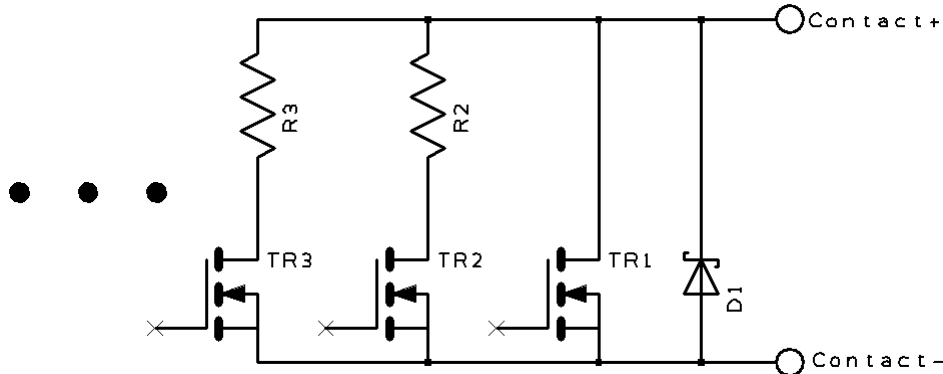


Fig 1: Schematic Switch Design, 12 each

MOSFET TR2-TR6 switch the different output resistances, TR1 creates a directly shorted output. The output can withstand 100V and 1A. The Schottky-diode D1 protects against reverse polarity. The electronic switches TR1-TR6 switch in less than 1 μ s and have an internal on-resistance of less than 50m Ω .

The switches are synchronized to better than 1 μ s.

2 Timing Circuit

The reference clock signals of the DRTS-12 are derived from either a built-in quartz generator or an external 10MHz reference source.

The switches are synchronously updated every 10 μ s. This is a ten times higher timing resolution than the TDR9000 provides.

Each of the twelve switch channels can be programmed with up to 32 independent on- or off-times. Each on-time can select a different in-line resistance.

The switching times can be set between 10 μ s and 100 s.

To synchronize the Breaker Tester, an independent Trigger switch output is provided.

3 Main Control and User Interface

The Main Control provides the start and trigger signal.

The user can program the different timing settings for each channel. Nine settings can be pre-programmed and simply recalled for a test.

The User Interface also provides functions to support the calibration of the DRTS-12 itself.

Preliminary Technical Data

Dimensions:	21 x 16 x 13 inches (53 x 40 x 33 cm)
Weight:	approximately 33 lbs (15 kg)
Power:	+12V _{DC} , 20 W

Output

Number of Channels:	12
In-Line Resistance:	0 Ω, 15 Ω, 100 Ω, 360 Ω, 1 kΩ, 6.8 kΩ
Accuracy of In-Line Resistance:	1% + 50mΩ
Residual Resistance of MOSFETs:	≤ 50mΩ
Switching Voltage:	≤ 100 V _{DC}
Switching Current:	≤ 1 A _{DC}
Channel Isolation Voltage to Ground:	200V _{AC}

Timing

Accuracy of built-in Timebase:	50 ppm
External Reference Signal:	10 MHz, 200mV – 10V
Reference Input Impedance:	1 kΩ 50 pF
Timing Range:	10 μs - 100 s
Timing Resolution:	100 μs

Programming

Number of Pre-Programmed Selections:	9
Number of On- or Off-Times per Channel:	32
Trigger Output for “Started”:	≤ 100 V _{DC} , ≤ 1 A _{DC}
Remote Control via:	RS-232